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Observation errors for satellite data assimilation

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The role of observation errors in the assimilation of observations is introduced. Together with background errors, the observation errors determine the weight of an observation in the analysis. Observation errors include measurement errors, but also forward model errors, and errors of representativeness. Various methods exist to diagnose observation errors from output of assimilation systems, and these will be introduced and illustrated with practical examples. It will be shown that satellite data often exhibit some error correlations, either spatially or, for radiances, between different channels.

The specification of observation errors in practice in real assimilation systems will also be introduced. Mostly, observation errors are assumed to be diagonal. Concepts to either counteract the effect of error correlations or to explicitly take them into account will be introduced, based on examples taken from the ECMWF system

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